DOCUMENT RESUME

ED 307 999 PS 018 067

AUTHOR MacDonald, Kevin
TITLE Parent-Child Interactions of ADHD Children: Comparisons with Children of Differing Sociometric Status.
SPONS AGENCY National Inst. of Mental Health (DHHS), Rockville, Md.
PUB DATE Apr 89
GRANT NIMH-1-R-01-MH-41697-01
NOTE 23p.
PUB TYPE Reports - Research/Technical (143)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Attention Deficit Disorders; *Hyperactivity; Males; *Parent Child Relationship; Parent Influence; *Peer Acceptance; Preschool Children; Preschool Education; *Rejection (Psychology)
IDENTIFIERS *Attention Deficit Hyperactivity Disorder; *Sociometric Status

ABSTRACT

An investigation was undertaken of the hypothesis that the parent-child interactions of children having an attention deficit hyperactivity disorder (ADHD) would resemble those of rejected children and differ systematically from the interactions of popular and neglected children. Subjects were 12 popular, 12 neglected, and 12 rejected boys of differing sociometric status who ranged in age from 3 to 5 years. Additionally, 13 children ranging in age from 3 through 6 years who had been diagnosed as exhibiting ADHD were recruited. Physician's records indicated that the diagnosis of ADHD had been made on the basis of parent descriptions of the child. Data were gathered through teachers ratings on the Conners Abbreviated Symptom Questionnaire and the California Child Q-set for each participating child, and videotapes of each parent playing separately with the child for 20 minutes. Videotapes were scored on the following behaviors: (1) parent direct and child direct; (2) parent suggest and child suggest; (3) parent question and child question; (4) physical play; (5) object play; (6) approach stimulation; (7) avoid stimulation; (8) overstimulation; (9) positive affective response; and (10) aggression. Findings indicated that, in general, although the parent-child interactions of the ADHD children tended to differ from all of the other groups, they tended to differ least from the interactions of rejected children. Results are discussed. (RH)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED307999

Parent-child Interactions of ADHD Children: Comparisons with Children of Differing Sociometric Status

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
X This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

Kevin MacDonald
Department of Psychology
California State University-Long Beach
Long Beach, CA 90840
(213) 985-8183

This research was supported by NIMH grant #1RO1MH41697-01.

PS 019067

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
Kevin MacDonald
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

BEST COPY AVAILABLE

Research on the linkages between the realm of parent-child interactions and the realm of peer interactions has indicated several important associations. Research within the attachment paradigm has shown that secure attachment in the early years is associated with successful adaptation with peers at a later age (Easterbrooks and Lamb, 1979; Matas, Arend, and Sroufe, 1978; Pastor, 1981). Besides these links between early behaviors and later competence with peers, Parke and his colleagues (Parke, MacDonald, Beitel, & Bhavnagri, 1988; Parke, MacDonald, Burks, Beitel, Carson, Bhavnagri, & Barth, In press) have also found several associations between concurrent parent-child interactions and status with peers. These studies have focussed on specific behaviors of the parent, such as the degree to which the parent controls the interaction, as well as skills which the child may acquire during parent-child interactions, such as affect-regulating ability and the ability to encode and decode emotional expressions. Moreover, there is evidence for an association between sociometric status and the degree to which parents facilitate and supervise the peer interactions of their children. The emerging picture is that of a very rich, multivariate set of linkages between these two realms.

This report extends this area of research by exploring the parent-child interactions of ADHD children, a group which is empirically linked with the literature on peer relationships. Several studies have found that ADHD children tend to be rejected by their peers (Johnson, Pelham, & Murphy, 1985; Milich & Landau, 1981; Milich, Landau, Kilby, & Whitten, 1982). Moreover, MacDonald (1987) showed that rejected boys scored significantly higher than popular or neglected boys on the Conners Abbreviated Symtoms Questionaire (Conners, 1973), scoring higher on items indicative of being generally more active, distractible, and disturbing to other children, and with more intense, negative moods.

These considerations suggest the hypothesis that the parent-child interactions of ADHD children resemble those of rejected children. MacDonald (1987) found that rejected children were intermediate between popular children, who engaged in high levels of physical play and positive affective arousal, and neglected children, who engaged in low levels of these behaviors. Nevertheless, the greatest differences occurred between popular and rejected children, who exhibited high rates of these behaviors, and neglected children with low rates of these behaviors. Moreover, rejected children were more often overstimulated during the physical play sessions, and engaged in higher levels of approach-withdrawal behavior. Regarding behaviors related to the relative degree of control in parent-child interaction, it was found that parents, especially mothers, of rejected children are more directive in their interactions with their children. Rejected children also made fewer suggestions during parent-child play, so that in general

the play sessions of these children appeared more one-sided than those of children in other sociometric categories. These findings parallel previous studies of parent-child interactions of ADHD children: The mothers of ADHD children are more directive with their children than were control mothers (Barkley, 1981; Battle and Lacey, 1972; Campbell, 1973; 1975; Cunningham and Barkley, 1979)

In summary, the present study will extend the MacDonald (1987) study by including a group of ADHD children in addition to the groups of rejected, popular and neglected children. It is hypothesized that the parent-child interactions of the ADHD children will resemble those of the rejected children and differ systematically from the interactions of the popular and neglected children in the ways described above.

METHOD

Subjects

The subjects included 36 boys of differing sociometric status (12 popular, 12 neglected and 12 rejected), described in MacDonald (1987). These children were recruited from 4 preschools and 2 kindergartens on the basis of sociometric status. They ranged in age from 3-5 years. For the present study, 13 children (11 boys) ranging in age from 3-6 (X=4.6) who had been diagnosed as exhibiting attention deficit hyperactivity disorder (ADHD) were recruited. These children were diagnosed by a physician with a large private practice located in a large metropolitan area in Southern California. Examinations of the physician's records indicated that the diagnosis of ADHD was made on the basis of parent descriptions of the child.

Subjects were recruited by positive responses to a letter which was sent to families of children being evaluated. The ADHD children had been diagnosed as ADHD but were not receiving medication. Of these 13 children, 2 were non-responders to medication, while in 11 cases the physician had advised a "wait-and-see" approach either because the child was viewed as borderline ADHD or because the child was still in preschool and might improve without medication.

In addition, teachers of the children were requested to fill out the Conners Abbreviated Symptom Questionaire. Based on a rating scale ranging from 0-3, the mean scores on the ten item questionaire were as follows: Popular children: X=5.5; Neglected children: X=5.0; Rejected children: X=13.6; ADHD children: X=19.8. There were significant differences between the ADHD children and the popular ($t(45)=8.6$; $p<.001$), neglected ($t(45)=8.9$; $p<.001$), and rejected children ($t(45)=3.7$; $p<.01$).

Finally, the teachers also filled out the California Child Q-set (Baumrind, 1968) for each child who participated in the

study. The q-sort consists of 72 items which are arranged on a 9-point scale according to how descriptive they are of the child. Table 1 indicates that the ADHD children differed systematically from the popular and negelected children, with few differences from the rejected children. ADHD children clearly were more difficult to supervise than these other groups (items 1, 11, 14), were less empathic and more aggressive than these groups (items, 2, 4, 6, 17), were highly extraverted (items 5, 7, 12, 15, 16), sensation seeking and active (items 13, 20, 21), expressed negative feelings (item 15), and were low on cognitive agency (items 3, 9, 18). The teacher data, then, indicate a strong similarity between the present sample of ADHD children and the group of rejected children. These findings are consistent with the common finding of low peer acceptance among ADHD children (see above) as well as the findings from the physical play sessions described below.

Procedures with Parents and Children

Each parent was videotaped playing with the child separately in a 20 minute session in the home of the subject. Both sessions were conducted on the same visit by the experimenter. In the case of the ADHD children, the order of the mother or father going first was randomly determined. The non-participating parent was requested to leave the room where the videotaping took place. For the first ten minutes the subjects were simply told that the experimenter was interested in play between parents and children. Prior to the second ten minutes the experimenter stated that "I am interested also in physical play between parents and children, activities like tickling, wrestling or chasing, if that is something you normally do with your child. If not, you can continue with your present activity or switch to an activity of your choice."

Coding Videotapes

The videotapes of the hyperactive children were scored by an individual trained to acceptabile levels of reliability when scoring the videotapes of the children of differing sociometric status. Reliability checks were made by comparing her scoring to that of the previously scored videotapes. As in the MacDonald (1987) study, the videotapes were divided into ten second epochs by printing a running time indicator onto the film. The following categories of behavior were scored, with Cohen's Kappa (Cohen, 1960) in parentheses. The behavior categories are not mutually exclusive.

---

1. In the MacDonald (1987) study the order was determined by the parents themselves. Post-hoc analyses revealed no differences between parents dependiung on order of testing.

1. Parent Direct and Child Direct. The number of commands made by the parent or child; e. g., "Don't do that.", "Give me that.", etc. For these categories, as well as for the categories of suggesting and questioning described below, each instance of the behavior was recorded, so that more than one instance of the behavior could occur in each epoch. (0.87)

2. Parent Suggest and Child Suggest. The number of times the parent or child makes a suggestion to the other in a non-imperative manner, e. g., "How about if we play checkers now?", or "Let's wrestle for awile, okay?". (0.87)

3. Parent Question and Child Question. This category was scored when either the parent or child asked the other to provide a suggestion as to what to do next, e. g., "What should we do now?" Thus this category excluded other types of questions, such as questions of information, e. g., "What color is that block?", or "Where did you put the marker?". (0.76)

4. Physical play. The number of epochs in which the parent and child engage in physical play together. Physical play includes a wide range of active play styles characterized by wrestling, tickling, swinging the child in the air, etc., but is not restricted to these specific activities, and includes physically active parent-child interactions that do not correspond readily to any of the usual categories of physical play. (0.95)

5. Object play. The number of epochs in which the parent and child engage in play with objects such as toys, board games, etc. This category often occurs during quiet play, but is compatible with physical play, as when a parent and child engage in a pillow fight. However, physical play often occurs without the use of any objects. (0.98)

6. Approach Stimulation. Any behavior by the child which promotes the initiation or intensification of physical play. Instances include verbal suggestions or directions in which the child seeks to prolong physical play when the parent wants to stop or slow the pace, as well as instances in which the child initiates stimulation, such as jumping on the parent. The measure is the number of epochs in which the behavior occurs. (0.85)

7. Avoid Stimulation. Any behavior by the child which promotes or attempts to promote the termination of physical play or lowers its intensity. Instances include verbal suggestions or directions in which the child seeks to avoid physical play when the parent wants to continue or intensify the pace, as well as instances in which the child

avoids or seeks to terminate physical play. The measure is the number of epochs in which the behavior occurs. (0.79)

8. Overstimulation. This category is scored if the child becomes overaroused during physical play. Overstimulation occurs when the child screams or shows a negative affective response to stimulation. The measure is the number of epochs in which overstimulation occurs. (0.91)

In addition, during each 10 second epoch the positive affective response of the child was rated on a 4 point scale. A rating of 1 indicated neutral affect; a rating of 2 indicated low level laughter; a rating of 3 indicated moderate laughter; a rating of 4 indicated intense laughter. Similarly, a 4 point scale for negative affect was constructed, with a rating of 1 indicating neutral affect, 2 indicating mild irritation, 3 indicating moderate dysphoria, and 4 indicating intense negative affect. The correlation between the ratings of two observers was 0.87 for positive affect and 0.81 for negative affect. The score for each category was obtained by summing the ratings over the epochs. Because of the difficulty of scoring low levels of positive affect such as similing with only one camera, smiling and other indications of low level positive affect were included in the category of neutral affect.

Finally, the category of aggression was introduced. This category was scored when the child exhibited hitting, kicking, scratching, or hair pulling directed at the parent. The category was scored because these behaviors, especially hitting and kicking, were quite common among the ADHD children and because of the well-known overlap between hyperactive and aggressive children (Hinshaw, 1987). However, these behaviors generally occurred in the non-hostile context of physical play and were not accompanied by anger or the intent to harm to the adult. (.86)

RESULTS

This report will stress the differences between the ADHD children and the sociometric categories of children described previously (MacDonald, 1987). A repeated measures analysis of variance was used to analyze the data, with sociometric status and ADHD diagnosis as a between subjects variable and sex of parent and session as within subject variables. Planned comparisons tested the hypotheses that the interactions of the ADHD children were characterized by more controlling statements (directing and suggesting) on the part of both parents and children; that they engaged in higher levels of physical play; showed greater positive and negative affect and aggression than the other groups; and showed more approach-avoidance behavior and overstimulation than the other groups. Differences between the ADHD children and the neglected children were expected to be most marked, while differences between the ADHD children and the rejected children were expected to be least marked.

The results are presented in Table 2. Regarding the category of parental directing, there was a significant main effect of Status ($F(3,45)=2.99$; $p<.05$), with parents of ADHD children directing more often than parents of popular or neglected children (See Table 2). There was also a significant interaction between sex of parent and status (($F(3,45)=3.90$; $p<.05$). The mothers of ADDH children were significantly more directive than mothers of the other three groups ($p<.05$ for rejected; $p<.01$ for popular and neglected groups). However, there were no significant differences between the fathers of ADHD children and the other three groups.

The category of child's directing resulted in a significant main effect of Status ($F(3,45)=3.27$; $p<.05$). ADHD children did more directing than each of the other three groups (See Table 2). In addition, directing by the child was more common during the second session than the first ($F(3,45)= 10.17$; $p<.01$) and there was a significant session X status interaction ($F(3,45)=3.06$; $p<.05$). The interaction was due to lessened difference between the ADHD children and the other groups in the second session. While there are no significant differences among the groups in the second session, in the first session the differences are highly significant ($F(3,45)=8.9$; $p<.001$) and the ADHD children are higher than each of the other three groups. ($p<.01$).

The category of parental suggesting, on the other hand, showed no significant main effects or interactions. For suggestions made by the child, however, there was a significant main effect of the status variable ($F(3,45)=4.17$; $p<.05$). ADHD children made significantly fewer suggestions than the popular or neglected children (See Table 2).

For the category of parental questions, there was a significant main effect for the status variable ($F(3,45)=10.60$; $p<.001$). ADHD children asked significantly fewer questions than each of the other three groups (See Table 2).In addition, there was a significant Status X Sex of Parent interaction ($F(3,45= 3.31)$; $p<.05$), due to the differences being much more prounced in the case of mothers ($F(3,45)= 11.9$; $p<.0001$) compared to fathers ($F(3,45)=3.5$ ($p<.05$).

For questions by the child there was a main effect of status ($F(3,45)=2.57$; $p<.05$). Planned comparisons indicated that the ADHD children asked fewer questions than the neglected children, but were not significantly different from the popular or rejected children.

The variable of play with objects showed a highly significant main effect of status ($F(3,45)=9.67$; $p<.001$). ADHD children played with objects significantly less than each of the other three groups (See Table 2). Play with objects was also more common in the second session ($F(1,45)=106.96$; $p<.001$).

Generally, the variables related to physical play showed the expected highly significant main effects of sex of parent and session. Moreover, there were often significant interactions between status and session due to the increased levels of physical play in the second sessions. Since the focus of this report is on differences between ADHD children and the other groups, these will not be commented on here.

The variable of physical play showed a highly significant main effect of Status ($F(3,45)=7.98$; $p<.001$). ADHD children engaged in significantly more physical play than each of the other three groups (See Table 2).

The category of overstimulation showed a significant main effect for the status variable ($F(3,45)=14.38$; $p<.001$). ADHD children were significantly more often overstimulated than each of the other three groups (See Table 2).

The category of avoiding stimulation showed a significant main effect for Status ($F(3,45)=11.83$; $p<.001$). ADHD children withdrew from stimulation significantly more than each of the other three groups (See Table 2).

The category of approaching stimulation resulted in a significant main effect for Status ($F(3,45)=14.06$; $p<.001$). ADHD children approached significantly more than each of the other three groups (See Table 2).

The positive affect ratings resulted in a significant main effect for Status ($F(4,63)=6.92$; $p<.001$). The ADHD children showed significantly more positive affect during the play sessions than each of the other three groups (See Table 2).

The negative affect ratings also yielded a significant main effect for Status ($F(3, 45)=6.80$; $p<.001$), with the ADHD group being higher than each of the other three groups (See Table 2). There was also a significant sex of parent X status interaction ($F(1,45)=2.84$; $p<.05$). This interaction was due to the contrast between ADHD children and the other groups being significant only with the father (A>P, $p<.01$; A>N, $p<.05$; A>R, $p<.05$).

Finally, the category of aggression resulted in a significant main effect for Status ($F(3,45)=25.47$; $p<.001$). The ADHD children showed significantly more aggressive behaviors than each of the other three groups (See Table 2). There was also a significant sex of parent X status interaction ($F(3,45)= 6.13$; $p<.01$). This interaction was due the differences between the ADHD children and the other groups being much more pronounced when in the presence of fathers ($F(3,45)=23.42$; $p<.0001$) compared to mothers ($F(3,45)=4.9$; $p<.01$). The comparisons between ADHD children and the other groups were far more striking with the fathers (all significant at $p<.0001$) than with mothers ($p<.05$).

Discussion

The parent-child interactions of the ADHD group were more often characterized by both parent and child attempting to exert control than in the other groups. The results replicate the findings of Barkley (1981), Battle and Lacey (1972), Campbell (1973, 1975) and Cunningham and Barkley (1979) that the parents of ADHD children, especially mothers, are more directive with their children. They also asked fewer questions than the parents of the three sociometric categories of children. The children also were more directive, made more suggestions, and asked fewer questions than the non-clinical sample. Moreover, the interactions of these children were characterized by less play with objects and very intense physical play. These children not only engaged in more physical play than the three sociometric categories of children but their play was characterized by high levels of overstimulation, approach and avoidance of stimulation, very high levels of both positive and negative affect, and aggression directed at the parents.

In general, although the parent-child interactions of the ADHD children tended to differ from all of the other groups, they tended to differ least from the interactions of rejected children. Like the rejected children, their interactions exhibited high levels of controlling statements, there was a great deal of affectively arousing phsyical play, but there were also high levels of overarousal and approach-withdrawal behavior. In addition, we have noted that ADHD children tend to be socially rejected by their peers.

These considerations suggest the possibility that ADHD can be understood as being extreme on dimensions of normal personality variation. Although ADHD has be conceptualized in a variety of ways, the present results are highly compatible with the idea that hyperactive children are extreme on two different independent dimensions of temperament (MacDonald, 1988). One dimension of the theory is termed emotionality and involves individual differences in the reactivity to stimulation. Such a dimension is included in a number of theories of temperament and adult personality, including Pavlov's (1927) strength of the nervous system, Rothbart's positive and negative reactivity (1987; In press-a), Buss and Plomin's (1984) emotionality, and Eysenck's neuroticism. Reflecting this consensus, Goldsmith (See Goldsmith, Buss, Plomin, Rothbart, Thomas, Chess, Hinde, and McCall, 1987) states that there is universal agreement that emotionality is a temperamental characteristic.

The other dimension of temperament involves what Rothbart (1987; In press) terms the self-regulation of behavior. This dimension involves a number of correlated appetitive traits, including Zuckerman's (1979) sensation seeking, Gray's (1981) impulsivity, and Cloninger's (1987) novelty seeking. Individuals high on these trait strongly approach sources of rewards,

minimize potential punishments, and engage in risky, disinhibited behavior and sensation seeking.

There is already considerable evidence that ADHD children are high in the temperamental trait of impulsivity-sensation seeking described above (Zentall and Zentall, 1978). For example, Brimer and Levine (1983) found that hyperactives sought auditory stimulation more than normals and propose that the high level of activity seen in these children is a result of an abnormal need for sensory stimulation. Fiedler and Ullman (1983) found that hyperactive boys were more curious than normal boys, a finding that could be interpreted as stimulus seeking. Medication with methylphenidate decreased the level of curiosity but the hyperactives still remained more curious than normal boys. Hyperactive children also are poor at monotonous tasks such as those requiring vigilance (See Douglas, 1988, for a review), a finding consistent with the idea that ADHD children seek high levels of stimulation. Moreover, Douglas (1988) notes that ADHD children are highly motivated by salient, immediate rewards. The trait of sensation seeking-impulsivity is fundamentally a trait involving a heightened sensitivity to rewards (Gray, Owen, Davis, and Tsaltas, 1983; Zuckerman, 1983; see MacDonald, 1988). In addition, individuals who are temperamentally unbalanced so that they are highly impulsive and motivated to seek out high levels of stimulation may well be low in what Gray (1982) has termed the behavioral inhibition system. Quay (1988) has proposed that ADHD children are deficient in their inhibitory abilities.

Physical play clearly involves very intense stimulation with a high level of reward value for ADHD chidlren. The present results indicate that hyperactive children, are very high in seeking out the stimulation provided in physical play. They have high levels of physical play and approaching stimulation. Moreover, interview data with the parents indicates that many of these children actively seek out physical play from their fathers, older brothers, adolescent neighbors, and their own peers. These findings fit well with the idea that these children are very sensitive to the reward value of this type of stimulation.

The temperament theory of ADHD also predicts the common finding that boys are much more likely to be ADHD than girls (Rutter and Garmezy, 1983). The evolutionary theory of sex differences predicts that boys will be higher on traits involving risk-taking, sensation seeking, and impulsivity than girls (Daly and Wilson, 1988; MacDonald, 1988). Moreover, the trait of sensation seeking-impulsivity is closely linked to aggression, although it is clearly not identical to it (MacDonald, 1988). Greater male aggression is predicted by evolutionary theory, and male-female differences in aggression are robust (Daly and Wilson, 1988; MacDonald, 1988). The present findings of greater levels of aggressive behaviors during the parent-child play of ADHD children is highly compatible with this result, and a great

many studies support a strong overlap between aggression (conduct disorder) and ADHD in children (see Hinshaw, 1987, for a review).

While the evidence described above strongly implicates sensation seeking-impulsivity as a temperamental factor in ADHD, there has been much less attention to the idea that ADHD children are extreme on the trait of emotionality. There is, however, considerable evidence that this is the case. First, descriptions suggestive of being high on emotionality are often included in clinical descriptions of ADHD children. For example, Wender (1987) notes that hyperactive children have mood swings and temper tantrums, and they tend to become overexcited during pleasant (i. e., rewarding) activities. Secondly, Douglas (1985) found that hyperactive children become highly aroused when rewarded and when anticipating reward during learning experiments, as well as when rewards are suddenly terminated. Finally, Jacobvitz and Sroufe (1987) recently found that hyperactive children tended to become overaroused during interactions with their mothers early in life.

The present results fit well with these findings. During the physical play episodes hyperactive children tend to become overexcited and they have difficulty calming down afterwards. The results described above indicate that overstimulation is common, and there is more negative affect and withdrawal from the source of stimulation among these children. Interviews with the parents confirm the idea that these children are emotionally labile, given to temper tantrums, and easily upset. The present results also suggest that hyperactive children also show high levels of positive affect. During the physical play sessions there are high levels of screaming and avoiding stimulation, as well as instructions to the parents to stop engaging in particularly arousing practices such as tickling. In some cases the children will scream and begin to avoid the parent even before the parent has actually touched the child. Parents sometimes comment that they are hesitant to engage in physical play with their child, even though he/she requests it, because the child gets out of control during the physical play and/or cannot calm down afterwards. During physical play the child often becomes over-excited and continues to engage in behavior that the parent finds objectionable, such as hitting or kicking, even after attempts at discipline on the part of the parents. In addition, the child often continues to elicit physical play after the sessions are over and the parent can only terminate this type of activity with great difficulty and often with tears and tantrum-like behavior.

This conceptualization of ADHD is thus explicitly dimensional. ADHD children are seen as being extreme on normal personality traits. Dimensional conceptions of clinical disorders, such as that of Cloninger (1987), have the advantage of providing a theoretical unity to clinical disorders.

Moreover, this unity can be related to etiology. Dimensions of temperament are the fundamental epigenetic rules which underlie human behavior. Understanding the neurobiology and genetics of these dimensions will thus also go a long way towards an understanding of the etiology of clinical diagnoses.

A dimensional perspective can also integrate the research and theory of clinical diagnoses with research on normal populations and thus be a part of a unified theory of development rather than a simple descriptive cataloging of diagnoses which are theoretically unrelated to each other. Thus it is not merely clinical samples which show the evolutionarily predicted sex differences, but normal samples as well. Boys generally are generally more aggressive than girls (Cairns, 1986), engage in more rough and tumble play (Blurton-Jones, 1972), are higher in sensation seeking (Zuckerman, 1983) and are lower on behavioral inhibition than girls (Rothbart, In press-a). Congruent with these results, Buss and Plomin (1984) found that girls are more likely to experience fear and anxiety than boys--i. e., girls are more likely than boys to experience the emotions associated with the behavioral inhibition system.

Finally, the dimensional perspective makes specific predictions, such as the sex difference in the prevalence of ADHD described above. The evolutionary-dimensional perspective on psychiatric diagnoses also predicts that females will be higher in anxiety disorders and phobias, whereas males, in addition to predicted higher rates of externalizing disorders, will more often be sociopathic (MacDonald, 1988). Ethnic differences in psychiatric symptoms can also be predicted based on knowledge that a particular ethnic group is higher in a temperament dimension. For example, there is evidence that Orientals are higher on behavioral inhibition than other ethnic groups (Freedman, 1974; Kagan, Kearsley, and Zelazo, 1978) as well as independent evidence that Orientals are higher on phobias and anxiety disorders than other ethnic groups (Kleinman, 1982).

The results generally implicate the importance of the reactivity and self-regulation of stimulation for social competence. Like the rejected children with whom they strongly overlap, the group of ADHD children tended to have difficulties in peer relationships, and like them there is a tendency toward emotional lability during the physical play sessions as well as high levels of seeking the physical stimulation involved in physical play. The rejected children in the MacDonald (1987) study can thus be seen as children who tend toward ADHD but whose symptoms are subclinical. Although the category of social rejection is a heterogeneous one (Parker and Asher, 1987), clearly a large subset of rejected children have difficulties in their reactivity and self-regulation of affectively arousing stimulation.

There is every reason to believe that physical play provides a window into some very basic processes involved in the regulation of affect. Some children appear to find this type of stimulation more rewarding than others, and some children are far more reactive to the stimulation involved in physical play than others. Parents must be highly sensitive to the cues of their children during physical play and there is great variation in the willingness of parents to engage in these behaviors. Moreover, physical play is an ecologically valid behavior in the sense that is naturally occuring both between parents and children and among children. Physical play is thus at the intersection between temperament and the social environment, and future research in this area will further understanding of basic developmental processes.

References

Barkley, R. (1981). The use of psychopharmacology to study reciprocal influence in parent-child interactions. Journal of Abnormal Child Psychology, 9, 303-310.

Battle, E. S., and Cunningham, C. E. (1979). The effects of ritalin on the mother-child interactions of hyperactive children. Child Development, 43, 757-773.

Blurton Jones, N. (1972). Ethological Studies of Child Behavior. Cambridge: Cambridge University Press.

Buss, A. H., and Plomin, R. Temperament: Early Developing Personality Traits. Hillsdale, NJ: Lawrence Erlbaum, 1984.

Cairns, R. (1986). An evolutionary and developmental perspective on aggressive patterns. In C. Zahn-Waxler, E. M. Cummings, and R. Ianotti (Eds.), Altruism and Aggression: Biological and Social Origins. Cambridge: Cambridge University Press.

Campbell, S. (1973). Mother-child interaction in reflective, impulsive, and hyperactive children. Developmental Psychology, 8, 341-347.

Campbell, S. (1977). Mother-child interaction: A comparison of hyperactive, learning disabled and normal boys. American Journal of Orthopsychiatry, 45, 51-57.

Cunninham, C., and Barkley, R. (1979). The interactions of normal and hyperactive children with their mothers in free play and structured tasks. Child Development, 50, 217-224.

Cloninger, C. R. (1987). A systematic method for clinical description and classification of personality variants. Archives of General Psychiatry, 44, 573-588.

Cohen, J. A. A coefficient of agreement for nominal scales. Educational and Psychological Measurement, 1960, 20, 37-46.

Conners, C. K. Rating scales for use in drug studies with children. Psychpharmacology Bulletin, Special Issue: Pharmacotherapy of children), 1973, 24-84.

Douglas, V. I. (1985). The response of ADD children to reinforcement: Theoretical and clincial implications. In L. M. Bloomingdale (Ed.), Attention deficit disorder: Identification, course and rationale. New York: Spectrum Books.

Douglas, V. I. (1988). Cognitive deficits in children with attention deficit disorder with hyperactivity. In L. M.

Bloomingdale and J. A. Sergeant (Eds.), Attention Deficit Disorder: Criteria, Cognition, Intervention. Oxford, UK: Pergamon Press.

Eysenck, H. J. Personality, Genetics, and Behavior. New York: Praeger, 1982.

Fiedler, N. L., and Ullman, D. G. The effects of stimulant drugs on the curiosity behavior of hyperactive boys. Journal of Abnormal Child Psychology, 1983, 11, 193-206.

Freedman, D. G. (1974. Human Infancy: An Evolutionary Perspective. Hillsdale. NJ: Erlbaum.

Goldsmith, H., Buss, A. H., Plomin, R., Rothbart, M. K., Thomas, A., Chess, S., Hinde, R. A., and McCall, R. (1987). Roundtable: What is temperament? Four approaches. Child Development, 58, 505-529.

Gray. J. (1982). The neuropsychology of anxiety: An inquiry into the foundations of the septo-hippocampal system.) New York: Oxford University Press.

Hinshaw, S. P. (1987). On the distinction between attentional deficits/hypractivity and conduct problems/aggression in child psychpathology. Psychological Bulletin, 101: 443-463.

Jacobvitz, D., and Sroufe, L. A. (1987). The early caregive-child relationship and attention-deficit disorder with hyperactivity in kindergarten: A prospective study. Child Development, 58, 1496-1504.

Kagan, J., Kearsley, R., and Zelazo, P. R. (1978). Infancy: Its Place in Human Development. Cambridge: Harvard University Press.

Kagan, J., Reznick, J. S., and Snidman, N. (1987). The physiology and psychology of behavioral inhibiiton in children. Child Development, 58, 1459-1473.

Kleinman, A. (1982). Neurasthenia, and depression. Culture, Medicine, and Psychiatry, 6, 117-190.

MacDonald, K. B. (1987). Parent-child physical play with rejected, neglected and popular boys. Developmental Psychology, 23, 705-711.

MacDonald, K. B. (1988). Social and Personality Development: An Evolutionary Synthesis. New York: Plenum.

MacDonald, K. B., and Parke, R. D. (1984). Bridging the gap: Parent-child play interactions and peer interactive competence. Child Development, 55, 1255-1267.

Orris, J. B. Visual monitoring performance in three subgroups of male delinquents. Journal of Abnormal Psychology, 1974, 69, 227-229.

Parke, R. D., MacDonald, K. B., Beitel, A., and Bhavnagri, N. The role of the family in the development of peer relations. In R. Peters (Ed.), Marriages and Families: Behavioral Treatments and Processes, In press.

Parker, J. G., and Asher, S. R. Peer relations and later personal adjustment: Are low-accepted children at risk. Psychological Bulletin, 102, 1987, 357-389.

Parry, P. A., and Douglas, V. I. (1983). Effects of reinforcement on concept identification in hyperactive children. Journal of Abnormal Child Psychology, 11, 327-340.

Pavlov, I. P. (1927). Conditioned reflexes, trans. G. V. Anrep. London: Oxford University Press.

Quay. H. (1988). Attention deficit disorder and the behavioral inhibition system: The relevance of the neuropsychological theory of Jeffrey A. Gray. In L. M. Bloomingdale and J. A Sergeant (Eds.), Attention Deficit Disorder: Criteria, Cognition, Intervention. Oxford, UK: Pergamon Press.

Rothbart, M. K. (1986. Longitudinal oberservation of infant temperament. Developmental Psychology, 22, 356-365.

Rothbart, M. K. (In press, a). Behavioral approach and inhibition. In J. S. Reznick (Ed.), Perspectives on behavioral inhibition. Chicago: University of Chicago Press.

Rothbart, M. K. (In press, b). Temperament in childhood: A framework. In G. Kohnstamm, J. Bates, and M. K. Rothbart (Eds.), Handbook of temperament in childhood. London: Wiley.

Rothbart, M. K., and Derryberry, D. Development of individual differences in temperament. In M. E. Lamb and A. L. Brown (Eds.), Advances in Developmental Psychology, Vol. 1. Hillsdale, NJ: Erlbaum, 1981.

Rutter, M., and Garmezy, N. (1983). Developmental psychopathology. In P. Mussen and E. M. Hetherington (Eds,) Handbook of Child Psychology. New york: Wiley.

Skrzypek, G. J. Effect of perceptual isolation and arousal on anxiety, complexity preference and novelty preference in psychopathic and neurotic delinquents. Journal of Abnormal Psychology, 1969, 74, 321-329.

Wender, P. H. (1987). The hyperactive child, adolescent, and adult. New York: Oxford University Press.

Zentall, S. S., and Zentall, T. R. Optimal stimulation: A model of disordered activity and performance in normal and deviant children. Psychological Bulletin, 1983, 94, 446-471.

Zuckerman, M. (1983). A biological theory of sensation seeking. In M. Zuckerman (Ed.), Biological Bases of Sensation Seeking. Hillsdale, NJ: Erlbaum.

TABLE 1

Teacher Q-sort Data by Status of Child

Status:	P	N	R	A	
1. Requires a great deal of supervision	3.8	4.7	6.3	7.5	A>P*** A>N**
2. Considerate	6.1	6.3	3.9	4.6	A<P* A<N*
3. Self-directed	5.9	3.7	5.8	4.5	A<P*
4. Bullies other children	2.7	2.8	5.5	4.4	A>P* A>N*
5. Typically in the role of listener	5.2	6.1	4.0	3.4	A<P* A<N***
6. Sympatheic towards peer distress	5.8	6.1	4.2	4.9	A<N^
7. Forcefully goes after what he wants	4.0	3.6	5.3	6.0	A>P* A>N**
8. Set goals which stretch his abilities	5.4	3.5	4.8	4.2	A<P^
9. Likes to learn new cognitive tasks	6.3	4.9	4.7	5.3	A<P^
10. Evades adult guidance	3.8	4.6	5.9	4.7	A<R*
11. Tests limits set by adults	3.3	5.0	6.3	6.0	A>P***
12. Hesitant with other children	4.6	5.8	4.9	3.5	A<N** A<R*
13. High energy level	4.5	4.6	6.7	7.4	A>P** A>N***
14. Obedient	6.3	6.0	4.0	4.8	A<P* A<N^

15. Expresses negative feelings openly and directly	4.8	4.9	7.0	5.1	A<R*
16. Spectator in social activities	4.8	6.3	4.8	3.8	A<N**
17. Polite	6.1	6.8	4.1	5.7	A<R*
18. Stretches to meet demands for excellence	6.0	3.9	4.9	4.2	A<P**
19. Easily upset	4.6	5.8	6.9	5.1	A<R*
20. Withdraws from excitement or commotion	5.3	5.1	4.9	3.5	A<P* A<N* A<R*
21. Impetuous	4.0	3.9	5.7	6.2	A>P** A>N**
22. Backs away from anger	5.2	5.6	3.3	4.0	A<P* A<N**

^p<.10; *p<.05; **p<.01; ***p<.001

TABLE 2

Group Means and Standard Deviations for Variables by Status of Child and Session

Status:	Popular		Neglected		Rejected		ADHD		
Sess:	1st	2nd	1st	2nd	1st	2nd	1st	2nd	
Behavior									
Verbal Variables									
Parent Direct									
M	17.6	20.9	17.3	14.8	26.8	18.7	25.3	27.3	A>P* A>N*
SD	12.0	6.7	13.5	10.9	8.7	9.2	11.7	10.5	
Child Direct									
M	6.3	9.7	5.3	10.4	5.3	12.0	15.2	13.7	A>P* A>N*
SD	4.7	7.7	4.7	8.1	4.7	10.2	7.9	7.3	A>R*
Parent Suggest									
M	12.2	11.7	10.3	10.4	8.1	9.7	8.8	10.2	
SD	11.5	6.5	5.9	5.1	9.5	6.2	4.3	8.1	
Child Suggest									
M	8.3	9.8	5.9	7.3	1.4	6.0	2.5	2.3	A<P** A<N**
SD	10.6	7.0	4.9	4.7	1.7	9.2	2.4	1.8	
Parent Question									
M	5.3	5.1	9.9	10.5	3.8	5.8	1.4	0.8	A<P** A<N***
SD	5.7	4.1	8.3	7.2	4.0	6.0	1.3	0.7	A<R**

Child Question									
M	1.0	0.6	1.3	1.7	0.1	0.3	0.2	0.3	A<N*
SD	1.9	1.0	1.8	2.4	0.3	0.8	0.7	0.5	
Object Play									
M	106.3	64.5	113.4	83.6	107.4	59.7	86.4	25.7	A<P** A<N***
	19.3	22.7	6.9	31.0	22.4	31.8	33.9	24.7	A<R**

Variables Relating to Physical Play

Sess:	1st	2nd	1st	2nd	1st	2nd	1st	2nd	
Physical Play									
M	11.2	66.0	7.7	23.9	14.4	53.6	36.0	91.4	A>P** A>N***
SD	19.3	30.2	15.6	26.3	35.3	42.8	32.0	25.5	A>R*
Positive Affect Ratings									
M	145.8	210.1	140.4	155.4	136.7	183.0	177.9	258.9	A>P* A>N***
SD	29.8	54.9	34.3	33.8	35.0	52.4	32.7	56.0	A>R**
Negative Affect Ratings									
M	0.8	0.4	0.6	1.7	1.3	1.6	4.5	8.8	A>P** A>N**
SD	1.8	1.4	1.4	2.9	2.6	5.7	6.0	7.9	A>R*
Approach Stimulation									
M	0.0	9.9	0.7	2.3	0.9	6.4	7.2	17.9	A>P** A>N***
SD	0.0	8.5	1.3	2.9	2.9	6.2	7.7	8.4	A>R**
Avoid Stimulation									
M	0.0	1.4	0.6	3.2	0.9	5.4	11.8	33.7	A>P** A>N**
SD	0.0	1.7	1.5	3.9	2.9	4.2	15.4	17.4	A>R**

Overstimulate									
M	0.0	1.2	1.3	2.5	0.0	6.1	6.2	22.2	A>P** A>N**
SD	0.0	1.5	4.6	5.3	0.0	6.1	7.9	14.8	A>R***
Aggression									
M	0.0	8.2	0.0	0.5	0.3	6.3	11.6	35.9	A>P*** A>N***
	0.0	5.9	0.0	1.2	0.9	1.5	15.3	20.8	A>R***

*p<.05; **p<.01; ***p<.001